

APRIL/MAY 2023

GCH11/DCH11 — ORGANIC CHEMISTRY – I

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

17. Why oxidation of trans-2-bromo cyclohexanol gives epoxy derivative and cis-2-bromo cyclohexanol derivative yields cyclohexanone-derivative?
18. (a) Discuss possible mechanism involved in hydrolysis of esters. (5)
- (b) Explain electrophilic substitution accompanied by double bond shift with suitable examples. (5)
19. (a) With the support of suitable examples explain mechanism of (i) Gattermann-Koch reaction (ii) Reimer-Tiemann reaction. (5)
- (b) Explain the formation and detection of arylne ion intermediate in aromatic electrophilic substitution. (5)
20. Explain the kinetic methods of determining the mechanism of organic reaction with suitable examples.

1. Draw the structural formulae of the (S)-2-Chloroheptane in the Fischer form.
2. How to convert the sawhorse projection to Fischer projection?
3. Draw the stable isomer of 1,4-dimethylcyclohexane. Why it is a stable conformer?
4. What is the stable conformation of 9-methyl decalin?
5. Why 1-iodobicyclo [2,2,2] octane is inert to hydroxide ion?
6. Give an example for  $SE^i$  reaction.
7. What is meant by o/p ratio? Give one importance of o/p ratio.



8. Give an example for Vilsmeier-Hack formylation. What is the role of  $\text{POCl}_3$  in this reaction?
9. How to express kinetic deuterium isotopic effect?
10. Give an example for stereochemical evidence in the determination of mechanism.

SECTION B — ( $5 \times 5 = 25$  marks)

Answer ALL questions.

11. (a) Discuss the stereochemistry of helical structures and spirocompounds.

Or

- (b) Explain the importance of erythro and threo nomenclature with suitable examples.

12. (a) Discuss the conformational features of different geometrical forms of 1,2 and 1,4-dimethyl cyclohexanes.

Or

- (b) Explain the stereochemistry and conformation of cis and trans-decalin.

13. (a) What is neighbouring group participation? Account for the formation of  $\text{Et}_2\text{NCH}(\text{C}_2\text{H}_5)\text{CH}_2\text{OH}$  from the alkaline hydrolysis of  $\text{Et}_2\text{NCH}_2\text{CHClCH}_2\text{CH}_3$

- (b) How to distinguish between  $\text{SE}^2$  from  $\text{SE}^1$  reaction?

14. (a) Explain the following reactions with plausible mechanism and example (i) Ziegler alkylation, (ii) Chichibabin reaction.

Or

- (b) Discuss different methods of generating benzyne intermediate.

15. (a) Write briefly about the isotopic effects in an organic reaction.

Or

- (b) Write the Hammett and Taft equations. Explain the parameters in these equations.

SECTION C — ( $3 \times 10 = 30$  marks)

Answer any THREE questions.

16. (a) Differentiate homotopic, enantiotopic and diastereotopic with faces example for each type. (6)
- (b) What is stereo selective synthesis? Explain with suitable examples. (4)